

Socio-economic status predicts UK boys' development of essential thinking skills

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A comparison of children in Hong Kong, mainland China and the UK has found that British boys' development of key thinking skills, known as 'executive functions', is unusually reliant on their socio-economic status.

The findings emerged from an ongoing project which is exploring contrasts in the development of these skills in Eastern and Western societies and their relationship to academic achievement. Executive functions are [cognitive skills](#) that help us to meet goals—such as our ability to ignore distractions or switch between tasks—and they significantly affect [children](#)'s performance at school.

Across two linked studies, researchers found that the socio-economic background of British boys is directly connected to these skills. Those from [wealthier families](#) typically performed better in tests of their [executive functions](#), while those from less-affluent backgrounds did worse.

The connection was far less direct for British girls, however—and absent altogether among boys or girls from mainland China and Hong Kong, who, despite being generally less affluent than their British peers, consistently outperformed them in the tests.

These results imply that specific cultural factors in children's lives that shape the acquisition of executive functions, also influence socio-economic gaps in academic outcomes. It is not clear what these cultural

'drivers' are, but they may include differences in curriculum, parenting, or attitudes to education.

The research was by a team of academics from the Faculty of Education and the Centre for Family Research, University of Cambridge.

Dr. Michelle Ellefson, Reader in Cognitive Science at the Faculty of Education, said: "Based on other research, we might have anticipated a direct link between [socio-economic status](#) and executive functions; in fact, this existed only for British boys. Pretty much any test pupils do at school requires executive functions, so if we want to reduce the achievement gap between children from different backgrounds, it's important that we understand the mechanisms behind that relationship."

Claire Hughes, Professor of Developmental Psychology in the Centre for Family Research, said: "There is concern in the UK that among children from less-advantaged backgrounds, boys in particular often under-perform academically, and the possibility has been raised in some research that features of their home environment play a role in this. What is interesting here is that we saw no relationship between socio-economic status and executive functions for boys in Hong Kong and China. We need to investigate why that might be the case."

The research was part of the Family Thinking Skills project, which is exploring links between executive functions, school attainment and [cultural differences](#) in Britain and Hong Kong by comparing data from children and parents in both countries. Executive functions are mediated by the brain's prefrontal cortex, which develops into our mid-20s, and this means that they are likely to be shaped in part by cultural influences like upbringing and environment.

The latest pair of studies looked at whether socio-economic status, which is known to influence children's performance at school, does so because

it impacts on their executive functions, or has an effect independent of cognitive skills. They also investigated how consistent the relationship is across genders. "Very little research has looked at this in Asia, and big differences with the UK might point to cultural differences driving attainment," Ellefson said.

Initially, the researchers used data from 835 children aged 9 to 16 living in Hong Kong and the UK. The participants completed computer-based thinking games to test their executive functions, and various mathematical tests to assess numeracy. Data about socio-economic status was also provided by their parents and through a survey.

Because children in Hong Kong are highly adept with computers from an extremely young age, which might distort the results in the thinking skills tests, a second study was undertaken with 453 children in Shandong, China, led by Ph.D. researcher Chengyi Xu. This deliberately targeted children whose use computers much less.

Overall, British students performed significantly worse in the numeracy tests, and their executive functions were about two years behind the level of their Chinese peers, even though British children tended to be from wealthier backgrounds. Within countries, there was little difference between girls' and boys' average test scores, although girls displayed slightly higher cognitive flexibility.

The children's levels of executive function and socio-economic status were both shown to affect their numeracy scores, but in most cases they did so independently of each other. The exception was British boys, for whom socio-economic status directly predicts executive functions, which in turn affects their numeracy.

The researchers also measured general cognitive skills, beyond executive functions alone. Here, they found that both boys and girls from wealthier

backgrounds in the UK tend to have better general cognitive skills than those from less-affluent families, whereas in China and Hong Kong, there was no relationship to socio-[economic status](#).

The data from Shandong also confirmed that computer usage had no effect on the acquisition of executive functions.

The results strongly suggest that cultural distinctions have shaped a gulf between the thinking skills of British and Asian children, with consequences for their relative attainment. More research is needed to establish what these are, but the nature of the school curriculum, teaching styles, parental expectations, or social attitudes to education, may be some of the factors involved.

In addition, the close link between socio-economic background and thinking skills for British boys in particular suggests that understanding more about these cultural drivers may help to narrow the attainment gap within the UK. "A clearer picture of why differences exist in the development of executive functions between children in Britain and Hong Kong would potentially help to inform interventions to reduce that gap," Hughes said.

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